Regulatory Framework in the Insurance Industry – The Solvency II Project

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Abstract

Insurance is of fundamental importance to both individuals and business because replaces insecurity with security and stability. The protection provided by insurance and the investments made by insurers contribute to economic growth and structural development. The role of public authorities is to provide an adequate regulatory framework allowing consumers to benefit from product innovation and to be protected. The study gives a brief review of the development of the insurance risk-management concept, analysis the goals and design of the Solvency II project and the solvency capital requirement formula according to the new regulation. In the end the results of the quantitative impact studies on the insurance industry are discussed.

Keywords: solvency, capital requirements, risk management, market discipline, quantitative impact study

1. Introduction

Insurance firms have an important role in the economic growth of a nation. One of the industry's main contributions is the raising of long-term resources, which increase the long-term investment potential of an economy (Nagar, 2005). The role of public authorities is to provide a regulatory framework allowing consumers and businesses to benefit from insurance competition, also ensuring them adequate protection.

The solvency can be defined as the ability of an insurance company to pay all its legal debts. The liabilities of an insurance contract are the expected claims and their associated expenses. The current values of these obligations, calculated on the basis of actuarial methods, are only estimates (Sandstrom, 2006). Considering the importance of solvability, the regulation authorities have developed and implemented systems for evaluating the solvability. The starting point was represented by the solvability requirements from the banking system (Basel II) and the reform of the international accounting standards (IAS) – Naghi (2013).

The remainder of this paper is structured as follows. Section 2 provides an overview about the evolution and necessity of solvency models, Section 3 analysis the framework and the design of the Solvency II standard model. Section 4 discusses the solvency capital requirements under Solvency II model, Section 5 analysis the impact of the European prudential regime on the insurance industry and Section 6 concludes.

2. Evolution and necessity of solvency models

The prudential rules in insurance are based on three main elements:
♦ the requirement of holding adequate provisions for insurance risks;
♦ the solvency margin defined as the minimal amount of regulatory capital an insurance company is obliged to hold against unexpected events, in excess of technical provisions, for being able to pay its policy-holders;
♦ the quantitative rules over the limitation of eligible assets for covering the technical provisions.

In 1997, the conference of the insurance regulatory departments of the EU states members decided to conduct a study on topics associated with solvency. The study analyzed the causes of the insurance industry's problems in the European countries over the last two decades. The issues related to solvability were sub-divided in two categories: *minimum guarantee fund and solvency margin,* with the proposal of significantly increasing the minimum guarantee fund.

In 2002, the first Life and General Insurance Directives - Solvency I - was adopted by the European Union, in an attempt of imposing a more flexible legislation for incorporating the developments from the financial services more quickly. The solvency capital requirements (SCR) under Solvency I model were the maximal value between the minimum capital and the solvency capital requirements according to the extent and type of business (Swiss Re, 2006). The strengths of the Solvency I framework were its simplicity and robustness.

However, Solvency I did not established at European level an appropriate harmonized definition of financial requirements, capitals and provisions. Therefore in many countries, national regulators have set additional rules beyond the Solvency I minimal requirements for considering the advances in risk management. This has led to a divergence of regulatory provisions and capitals held by insurance companies in different member states being detrimental to achieving a single EU market for insurance.

Another important weakness of this system was that it fails to motivate companies to use modern risk management practices. Since the introduction of the current solvency framework in the early 70's, risk management techniques have become significantly more sophisticated (Ciumas and Vaidean, 2007). Because economic conditions change and new risks emerge, Solvency I have proved not to be sufficiently risk sensitive, or not sufficiently accurately in capturing new and emerging risks.

In Solvency II model, the aim is to develop a coherent framework with consistent solvency measures across all types of business. The framework will also take into account the quality of risk management as well as the accuracy of risk assessment. The Solvency II model belongs to the third generation of solvability evaluation systems, using stochastic models for particularizing according to each insurance company's data. These internal models are the last development in the field and because of their advantages are supported by the supervision authorities.

3. Framework and design of the Solvency II project

The Solvency II project was intended to examine the working methods of insurance regulators in Europe. The main outcome of the directive was that the method of calculating solvency capital was changed. The existing approach is based on underwriting, whereas Solvency II is based on a combination of the risks facing insurance firms (Wiener, 2007).

The target of the Solvency II project is to improve the European insurance regulation by introducing (CEA, 2006a): a risk-based system, an integrated approach for insurance provisions and capital requirements, a broad framework for risk management, capital requirements defined by a standard approach or internal model, diversification and risk mitigation.

The risk-based system measures the level of risk in a portfolio, and indicates a proportionate amount of capital, leading to the most efficient use of capital possible.

The integrated approach for insurance provisions and capital requirements refers to the opportunity to move from an individual approach to a holistic approach where assets and liabilities are valued consistently with market principles.

A broad framework for risk management*.* Solvency II defines capital requirements and obliges companies to establish systems, processes and controls for risk management. The incentive to improve will exist because such companies will be rewarded by lower capital requirements.

Capital requirements defined by a standard approach or internal model*.* The degrees to which assets and liabilities from the insurance portfolio are matched will have impact on capital requirements. An aggressive investment strategy like investing in high-risk assets will require more capital, but risk management techniques, such as reinsurance and hedging, can reduce risk levels.

For capturing the above effects, many companies have developed sophisticated computer models to test the effects of different events on their insurance portfolios. These models can return the amount of capital needed to resist various adverse situations that may arise. For the companies that cannot meet the costs of building such models, the Solvency II framework will offer an alternative ***European Standard Approach (ESA)***. This approach follows the same principles as the internal models and will achieve similar results, but needs to incorporate margins for conservatism because it is not designed to a specific risk profile. Although the 'Standard Approach' is cheaper and easier to use than an internal model, there will be a tradeoff between simplicity and conservatism which provides an incentive for all companies to move to the more sophisticated approaches over time. The decision about choosing one option remains with the company.

Diversification and risk mitigation. Diversification is based on the principle that not all risks will occur at the same time – considering the underlying sources of risk independent. An insurance

company that underwrites a large number of risks is unlikely to suffer claims on all of them at once. The larger the number of risks, the more accurate will be the prediction of losses (the law of large numbers). Due to diversification, the capital requirements for a whole insurance undertaking will be less than the sum of the single capital requirements for each component separately.

As with Basel II for the banking industry, Solvency II aims to build a new regulatory framework for the insurance sector. The three pillars developed under Basel II provide an obvious model for Solvency II, but the similarities are limited. The insurance industry's business model is very different to that of banks, developing its own set of principles for considering the insurance specificities.

The Solvency II Pillar 1- quantitative requirements: rules on financial resources

The first pillar includes prudential rules on technical provisions, investments and capital requirements. Solvency II aims to harmonize methods for calculating technical provisions and to line up with developments in the International Financial Reporting Standards (IFRS). CEIOPS (Committee of European Insurance and Occupational Pensions Supervisors, 2008) recommends "that evaluation of insurance liabilities should be based on the expected present value of cash flows (best estimates), together with an explicit risk margin". The introduction of a market-consistent valuation of assets and liabilities is one of the major differences between Solvency I and Solvency II and will impact the outcome of the solvency calculation. The first pillar contains two levels of capital requirements:

a. *Solvency Capital Requirements* (SCR): the amount of capital required from the insurer allowing him to absorb unexpected losses and meet its obligations towards policy-holders at a high level of equitableness.

b. *Minimum Capital Requirement* (MCR): this requirement relates to the minimum amount of capital below which the immediate intervention of the Insurance Commissioner is required. The calculation will be implemented by means of VaR at a significance level between 80 and 90 percent. The minimum capital level will be one million euros in general insurance transactions and two million euros in life insurance transactions. The calculation of the capital requirements could be performed either by using a *European standard approach (ESA)* or through an *internal model* developed by the company and permitted by the supervising authority. The ESA should enable companies to measure and calculate their SCR in a simple and correct way (Dutescu, Sahlian and Stanila, 2008). One of the basic ideas of this approach is to use a simple standardized factor based approach to estimate and evaluate each risk component separately: market risk, underwriting risk, credit risk, operational risk and all their respective sub-categories of risks (Eling, Schmeiser and Schmit, 2007). For estimating the credit risk Van Laere and Baesens (2010) and Dragos (2006) have developed an internal credit rating model for corporate exposures in the portfolio of an insurance company by using a logit and probit approach. The basic idea of the framework for the Life and Non-Life insurance is the same but there are differences between them, regarding the underwriting risks.

The Solvency II - Pillar 2 – qualitative requirements: supervisory review process and risk management

The second pillar provides principles for the supervisory process and for insurers' internal control and risk management. It refers to harmonizing the supervisory processes at EU level, coordination in times of crises, rights and duties of the supervisory authorities, principles on transparency and accountability of the supervisory authorities, and a peer review process. It also sets out principles for internal control systems and for risk management. Key elements are the control of internal risk models, the use of stress tests, governance processes and fit and proper criteria for the senior management, and quality of risk mitigation (including reinsurance).

Solvency II- Pillar 3 – market discipline: disclosure and transparency

The third pillar refers to disclosure and transparency to reinforce market mechanisms and risk-based supervision. The aim is to provide policyholders, investors, rating agencies and any other interested parties a comprehensive picture of an insurer's risks. Disclosure requirements will depend very much on the measures implemented in pillars I and II Linder and Ronkainen (2004). The reporting requirements will rely on the Basel II approach applied in the banking sector and the accounting work done by IASB. Unfavorable information of an insurer could aggravate an already bad situation of a country so future disclosure rules need to balance the public's interest on information and the insurer's interest on competition.

It is important that the three pillars should not overlap with each other, imposing double layers of conservatism. Combined with harmonization across Europe, it is the nature of the business and the risks that determines solvency, and not the location of the company. Reflecting the principle of coherency, Pillar I capital requirements will capture and adequately quantify all risks on a balance sheet. Pillar II will supplement Pillar I and promote good corporate risk management. Pillar III completes the framework by developing market discipline and a risk dialogue among stakeholders.

4. Discussions over Solvency Capital Requirements under Solvency II project

As part of the Solvency II project, the European Commission has requested EIOPA (European Insurance and Occupational Pensions Authority) to run a number of large scale field-testing exercises, so-called Quantitative Impact Studies (QIS), to assess the practicability, the implications and possible impact of the different alternatives considered.

EIOPA launched a first QIS (QIS1) in autumn 2005, the results of which were received in February 2006. The exercise focused on testing the level of prudence in technical provisions under several hypotheses. In the summer of 2006 EIOPA conducted a more comprehensive second impact study (QIS2), which covered both technical provisions and the calculation of the solvency capital requirement (SCR) and minimum capital requirement (MCR). QIS2 focused on

the methodology of the solvency requirements; the testing of the calibration of the parameters was left for the third study (QIS3). Building on the findings of the previous QIS exercises, QIS3 was launched in April 2007. The results of QIS3 were reported in November 2007 and laid the basis for the fourth quantitative impact study (QIS4) who took place from April to July 2008. The results of QIS4 were reported in November 2008 and the results of the fifth quantitative impact study QIS5 were reported in March 2011. The aim of these Quantitative Impact Studies started in 2005 is to simulate the calculation of the solvability and margin capital requirements. The solvency capital requirement consists of the *Solvency Capital Requirement* (SCR) and the *Minimum Capital Requirement* (MCR). These are not separate or additive capital requirements, but rather, the MCR forms a part of the SCR.

The *MCR* indicates a critical level of capital below which a company cannot be allowed to carry on its operations normally and stringent supervisory powers take effect. It is intended that the MCR should be a fairly simple calculation that can be calculated and reported to supervisors on a quarterly basis. The aim is for the MCR to be calibrated to the value at risk (VaR) of 80% - 90% over a one-year time horizon. In QIS4 the MCR is calculated on the "linear approach" using percentages of provisions and capital at risk.

The *SCR* can be calculated either by using the standard formulae or by using suitable internal models. The aim is for the SCR to be calibrated to the value at risk of 99.5% over a one-year time horizon. The SCR standard formula follows a modular approach where capital charges are determined for the various risks and then combined using prescribed correlation matrices.

QIS5 has confirmed the support from industry and supervisors for the **modular structure** of the standard formula for the calculation of the capital requirements. This modular structure is composed of different risk modules and sub-modules, for each of which a capital requirement needs to be calculated (see Figure 1). These modules and sub-modules are then combined through correlation factors, through which diversification effects are taken into account. As diversification effects are difficult to calculate, the calibration of the correlation factors has been subject to many comments. Undertakings would also welcome more transparency on the calibration of the various (sub-) modules.

Figure 1. Calculation of Solvency Capital Requirements (SCR) according to QIS5
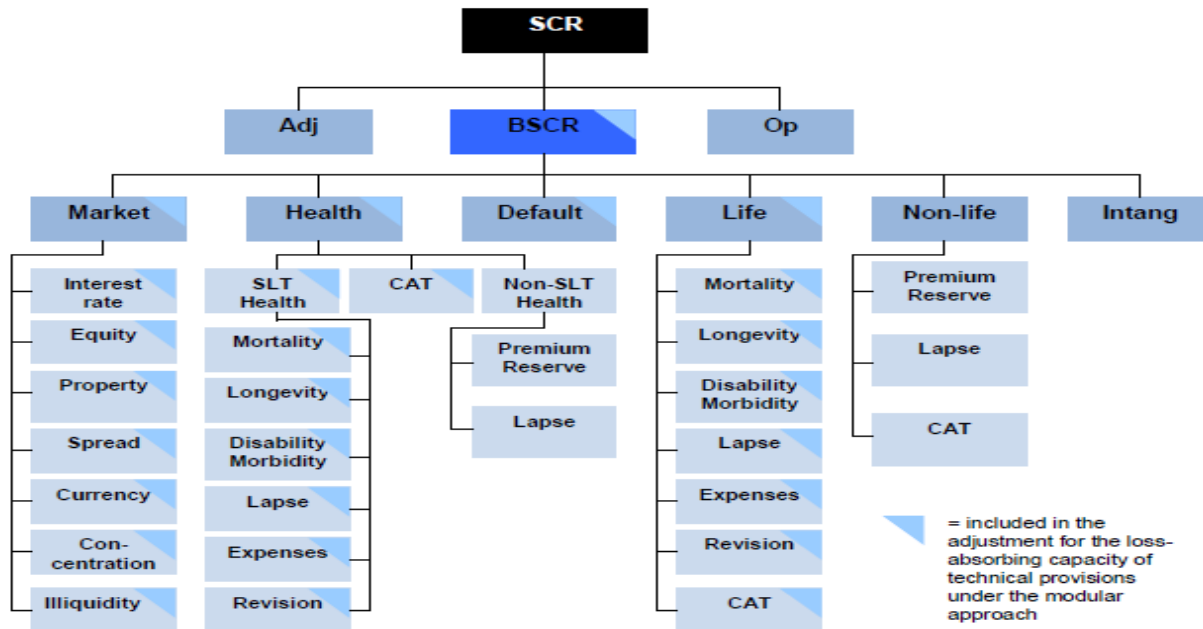
Source: EIOPA' QIS5 – Technical Specifications, July, 2010

$$SCR = BSCR + Adj + SCR_{op}$$

SCR - Solvency Capital Requirement

$BSCR$ - Basic Solvency Capital Requirement

SCR_{op} - The capital requirement for operational risk

Adj - Adjustment for the risk absorbing effect of technical provisions and deferred taxes

The Basic Solvency Capital Requirement (BSCR) is the Solvency Capital Requirement before any adjustments, combining capital requirements for six major risk categories.

SCR_{mkt} - Capital requirement for market risk

SCR_{def} - Capital requirement for counterparty default risk

SCR_{life} - Capital requirement for life underwriting risk

SCR_{nl} - Capital requirement for non-life underwriting risk

SCR_{health} - Capital requirement for health underwriting risk

$SCR_{int\,angibles}$ - Capital requirement for intangible assets risk

$$BSCR = \sqrt{\sum_{ij} Corr_{ij} \cdot SCR_i \cdot SCR_j + SCR_{int\,angibles}}$$

$Corr_{i,j}$ - the entries of the correlation matrix *Corr*

$SCR_i\ SCR_j$ - Capital requirements for the individual SCR risks according to the rows and columns of the correlation matrix *Corr*.

$SCR_{\mathrm{int}angibles}$ - the capital requirement for intangible asset risk calculated in accordance with SCR.4

Considering the Solvency II standard formula for the Solvency Capital Requirements there is a strong debate in the academic literature.

The implementation of the Solvency Capital Requirement (SCR) is needed to assure, for all the European insurance companies, a theoretical ruin probability of less than 0.005. Starting from the standard formula for the calculation of SCR, Hampfel and Pfeifer (2011) introduced a correction formula. They consider that the restriction of a mean of 1 for the lognormal distribution from the SCR formula is not appropriate for taking into account the individual risk situation of each insurance company.

Koller (2011) considers that the target of an insurance company is to optimize its risk adjusted returns without any attempt of under- or overestimate its capital requirements. Christiansen, Denuit and Lazar (2012) affirm that an internal model of SCR should not be based on the standard approach of the square-root formula if an overestimation of these capital requirements is not wanted. Their numerical illustrations performed on German data have suggested that the QIS correlation matrix was not appropriate and that the correlations greatly varied from one product to another. They concluded that the problem was not so much the square-root formula itself but the fact that the same correlation values were used for all types of products.

A possible solution for the problem encountered by Christiansen, Denuit and Lazar (2012) could be the approach of Planchet, Guibert and Juillard (2012). They consider three key risk drivers (reserves, premiums and financial risk) for determining the distribution of the solvency coverage ratio. They use an Own Risk Solvency Assessment (ORSA) perspective for measuring the uncertainty of the solvency ratio by deploying a lognormal distribution for approximating the distribution of the liabilities. The advantage of this approach is that it can be used as an internal model, along with the standard model, being inexpensive in terms of time computation.

5. The impact of the European prudential regime on the insurance industry

The Solvency II regime will apply to all insurance companies from EU, starting with 2015, excepting the small companies with subscriptions lower than 5 million euro per year. The European Union nominalized EIOPA (European Insurance and Occupational Pensions Authority) to identify the impact of the new solvability regime over the value of the insurance companies performing a series of 5 impact studies.

With a total of 1,313 insurers and reinsurers, 99 captives and 15 insurance groups taking part in the fourth Quantitative Impact Study, the European Commission achieved its participation target of at least 25% of all European insurance companies and 60% of all European insurance groups. Compared with QIS3, the participation rate was almost 40% up, even though the work

involved in conducting the study increased significantly. For the first time since the test runs began, insurance companies from all EEA states (i.e. the member states of the European Union plus Iceland, Liechtenstein and Norway) took part in the study (Munich Re, 2008). Romania has also participated for the first time at a quantitative impact study with a number of 7 insurance companies (2 Life, 3 Non-Life and 2 Composite[1]).

The president of the Romanian Insurance Supervising Commission (CSA-ISC) said during an insurance seminar on November 26 that "most insurance companies will not be significantly affected by the new solvency regime (the European Solvency II directives to be implemented in 2012). Moreover, the technical reserves will be reduced, mainly in respect to the life insurance policies, thus contributing to the increase of the relevant companies' own capital, revealed the quantitative impact studies (QIS4) conducted by CSA-ISC based on the 2007 data submitted by the companies. On the other hand, the solvency capital requirements will rise, especially in regard to the general insurance policies, with a higher underwriting risk".

General insurance companies are most affected by the introduction of the new solvency requirements. The QIS4 study showed that two out of the three analyzed general insurance companies have reported a 50% decrease of the capital surplus (the difference between own capital and the solvency capital requirements) following the implementation of the new rule. However, according to CSA, there are a small number of companies that would have to raise their capital in order to cover the minimum capital requirements and the solvency capital requirements.

Solvency II might have a greater impact on medium insurance companies. According to the QIS4 specifications, a company must report gross underwritten premiums worth between 100 million and 1 billion euros and gross technical reserves between 1 and 10 billion euros in order to be regarded as medium company. There were 42 insurance companies on the Romanian market in 2007, of which 35 were small and 7 medium companies. According to the Solvency II project approved by the European Commission in 2007, this solvency regime will be enforced on companies reporting gross underwritten premiums exceeding 5 million euros. There were some 25 insurance companies in Romania in 2007 complying with that requirement.

The scope and complexity of this fourth study has shown how important the future quantitative requirements are for the development of a risk-based solvency system. The range of results, however, remains very broad, which makes comparative evaluation difficult. But even if the results of this study can only be a conservative estimate of the effects of the new quantitative requirements on total capitalization, they are a good opportunity for companies to deal in detail with the issue – Dragos (2009).

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[1] The classification between Life/Composites is not always a strict one since life undertakings are allowed to do supplementary insurance (in particular, personal injury which is non-life business).

Within the fifth quantitative impact study there were 18 insurers from Romania, respectively 5 life insurers, 5 non-life insurers and 8 composite insurers. Considering this last calibration study performed in Romania (QIS5), the total value of the balance sheet actives declined with 9,77%. Concerning the liabilities, the values of technical reserves reduced with 29,32%, especially for the life insurance sector, thus registering an increase in equities. If we analyze the excess of capital according to Solvency II (computed as a difference between the available solvency margin and the minimum solvency margin) we remark a decrease, following the increase of the capital requirements. For the non-life insurances an increase of the solvability capital requirements was observed. From this point of view out of the 18 Romanian companies participating to the study, 3 did not meet the Solvency Capital Requirements (a value of own funds lower than SCR) and will be monitored for correcting the risk profile – Naghi (2013). Concerning the solvability degree (computed as a fraction between the own funds and the SCR) it dropped with a third compared to QIS4, reaching 1,64 (for the Solvency I regime the solvability degree was 3,31).

A positive aspect of the fifth impact study is that all the participating companies registered higher own funds then Minimum Capital Requirements (MCR), the excess of capital being 52,5 % greater than the one calculated in the Solvency I regime. Among life insurance and general insurance, the last one was the most affected by applying QIS5. The supplementary capital requirements determined the decrease with over 50% of the initial capital surplus, for half of the Romanian companies participating to the study.

The results also show, however, that further efforts will have to be made to master the future quantitative requirements in practice. The main focus of these efforts will have to be on matters relating to the consideration of deferred taxes and the further development of the group solvency perspective.

The results of QIS4 and QIS5 are relevant for the adoption of the Solvency II Framework Directive Proposal by the European Parliament and the European Council and will be of particular importance in the design of any implementing measures to be drafted, based on this Framework Directive.

6. Conclusions

After its implementation the impact of the Solvency II regime in Europe will be significant. It will change the way that firms are required to look at their governance, risk and capital management process. Solvency II will result in convergent approaches of the supervisory and rating agencies. It will also add to the pressures to consolidate. Survival on the insurance market will depend on insurers' capability to offer a wide range of products and to hold the distribution for niche products. The stand of small to medium company is disturbing and it will be more and more uncomfortable. These companies will be the main victims of consolidation.

Transparency has a significant influence on consolidation. Transparency at companies' level is improving and the process will continue through Solvency II project. The transparency of

products will increase allowing the consumers and intermediaries to make more informed choices. In conclusion, the main changes brought by the Solvency II regime refer to:

- the alignment of the capital requirements with risk by introducing appropriate capital measurement methodology and validation procedures for regulators;

- the improvement of risk management competences by encouraging more the internal models for solvency assessment;

- the creation of a profitable field across financial services by harmonizing the levels of prudence and capital across financial services companies and conglomerates.

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